Curriculum Review Committee

Chemistry Curriculum Review

Follow-up Report for March 8, 2006

Attendees

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Descriptions

The Chemistry program collaborates with workforce education programs, four-year programs and industry.
The CHE101, 102, and 103 series is intended for allied health, biotechnology, and nursing students. Nursing students take only 101; advance nursing students may take 102 and 103. Dental Hygiene students take CHE 101 and 102. CHE 211 is a required chemistry course for the biotechnology certificate.

CHE139 prepares students for the more rigorous general chemistry series, 140, 150, and 160. Chemistry, engineering, pre-med and other majors take this series which serves students seeking 4-year science degrees. CHE231, 235, and 236 is the organic chemistry series that follows the 140, 150, 160 series.

The program is well tied into transfer and industry through the full-time faculty. The PAVS report provides several examples of faculty collaborating on projects with industry, the University of Washington and Seattle University.

The program has received grants locally and federally (i.e. National Science Foundation, Title III) for professional development, projects, student stipends, lab equipment and lab materials.

Enrollment Trends

Course offerings reflect the demand. Courses required by other Seattle Central programs are offered more frequently. CHE 101 is offered every quarter. The demand for CHE 102 and 103 is not as great and are offered less frequently. Overall, Chemistry courses are in high demand: All chemistry courses fill to capacity and waitlists are capped at 10 students.

The Chemistry Labs

The day chemistry courses have “open” labs, meaning that students attend a lab lecture together and then visit the chemistry lab at their convenience. Evening courses have “closed” lab time, where students attend lab together as part of the course.

The open lab structure helps reduce conflicts with other courses, but it does require the presence of a lab assistant. With the completion of the Math and Science building Fall 2006, the chemistry will add one more lab but the program anticipates no additional staff.

Concerns

Part-time Faculty and Lab Staff

Two significant concerns were raised during the program review regarding faculty and staff.

1) It is very difficult for the program to locate and keep part-time faculty. Seven of nine part-time faculty were hired in 2005 or 2006. Curriculum and part-time continuity is difficult to maintain. When all three full-time faculty are teaching full loads, it is difficult for them to provide the support needed to so many part-time faculty. When one full-time person is on leave, it is that much more difficult to sustain the program. The Chemistry PAVS report states, "The three full-time faculty are not able to train and support so many faculty. The number of faculty and staff is not really adequate for a viable, developing program that is able to keep up with innovations and new technology. With more FT faculty in the program, more sections of the lower level courses could be taught, so that the upper level sequences would fill with higher S/F ratio"

Response: I am very pleased that the department has the support of the CRC in increasing the number of full-time faculty and obtaining release time for the coordinator. To the best of my knowledge the issue of increasing the number of FT faculty has been in the minds of faculty and administrators for at least the past 10 years. Given our multiple justification statements (the latest having been presented to the Dean of Science & Mathematics 2 years ago) and the current hiring freeze, the chemistry department is no closer to remedying a crisis situation.

In my five years at SCCC the department has dealt with the leave or reduced workload of 5 members (faculty and staff) for emergency medical issues, general health issues, personal tragedy, burnout, sabbatical leave, and family leave. While it is not uncommon for a department to undergo such changes, this department of 3 full-time faculty and 1 full-time staff, while executing its charge, has been stretched to its limit in handling these changes.

The quality of our program has suffered and we are losing students to other institutions and student mastery of chemistry is at risk. Since my arrival in 2001, 20 part-time faculty have been hired to teach all course offerings. In winter '03, three FT faculty taught 8 sections with the 6 PT faculty teaching 8 more sections. Three of these PT faculty were new that quarter, so there was a need for more interaction and mentoring than the FT faculty with their heavy loads could meet. One of the new PT faculty members was hired about one week before winter '03 started. This person was the only one found for the class (not an ideal fit and was not asked to teach again). This happened again in winter '04 with someone hired at the last minute having to be replaced already in January because of inadequate skills. In winter '06 and spring '06 the department dealt with the vindictive and inappropriate behavior of two PT faculty that resulted in unprecedented numbers of student complaints to the faculty coordinator, dean, and associate dean of student leadership, and early removal of an instructor in one class. In these instances the students involved have left dissatisfied (at best) about their education. Thus, quality and consistency suffer which necessitates the hiring of another full-time faculty member.

The chemistry department recently acquired state-of-the-art instruments that make it unique among community college departments. We are excited about our program and have

discussed the development of new courses using this instrumentation (for chemistry, biotechnology, and bioengineering students). We are particularly interested in training students for research in the fast growing and competitive biotechnology and bioengineering arena. Our department is poised to attract more students who need a strong chemistry background given these excellent resources. These potential offerings are only possible with the expansion of our full-time faculty. Our current teaching schedules with large classes (mostly the lower level courses) do not allow for the time to develop these new courses, much less teach them, as we would need to increase our already large PT/FT faculty ratio.

Over the last three years on average 32% of the total chemistry students have taken one or more of the following: CHE 101, 102, 103, and 211. These courses are required for students in allied health and biotechnology. As enrollments increase so does the demand for these classes which usually translates into overfull classes rather than opening new sections. Overfull classes severely limit an instructor's ability to engage students for successful learning. It is also difficult to find qualified instructors on short notice when additional sections are approved. In order to maintain the high quality of SCCC's chemistry program and to be able to attract and retain students through the whole program, we must respond to the demand for our chemistry classes: this response should be to increase the number of FT faculty.

The number of faculty and staff is not adequate for a viable, developing program that is able to keep up with innovations and new technology. Particularly the 2004-2005 FT:PT headcount ratio of 1:3 and the FT:PT FTEF ration of 1.16 to 1 are out of line; the American Chemical Society "Guidelines for Chemistry Programs in Two-Year Colleges" suggests the FTEF ratio should exceed 3:1. With more FT faculty in the program, more sections of the lower level courses could be taught, student retention would increase, and upper level sequences would fill with higher S/F ratio.

2) The open lab classes must have regular staff to set-up and take-down equipment, monitor supplies and materials, and assist students with their lab assignments. Currently there is one full-time lab staff person and one part-time staff for the day classes and no lab staff for the evening classes. Labs are incorporated into the corresponding Chemistry course and the under-supported, part-time faculty are responsible for equipment and materials.

Course Content, Outlines and Syllabi

The course outlines and syllabi need revision and/or updating. Particularly needing attention are course learning outcomes. Many outlines and most syllabi are missing these, or they are too generally stated. For example there is only one, admittedly outdated, outline for the CHE 140, 150, 160 series. It is confusing to know which outcomes are associated with which course. As such, there is a concern about the transferability of the courses to four-year institutions.

Response: I am very appreciative of the CRC's thorough review of the chemistry department's course syllabi and outlines. Each outline will be updated to include course outcomes and the syllabi will reflect these changes. These changes are long overdue and will help better inform both students and faculty about the demands and purpose of each course.

The Chemistry faculty noted that CHE101, which was designed for nursing students, has too much content. The chemistry faculty would like to revise the course outline, but the nursing program is unwilling to require its students to take more than one quarter of chemistry. In addition, the math prerequisites are insufficient for CHE101.

Course Scheduling for Non-Science Students

Given the high demand for the chemistry series courses, and the insufficient number of full-time faculty and lab staff, the program is forced to place lower priority on CHE100, a course that meets a general education and lab requirement for non-majors. It is difficult to achieve program's mission to "provide its students with an excellent education in chemistry that interests both science and non-science students."

Response: The faculty continues to be very interested in developing courses for non-science majors that develop scientific aptitude in the context of case studies/history. As the CRC pointed out, the department's priority is the majors coursework given the limited resources in faculty and staff.

Recommendations

1. Each course outline and course syllabus be reviewed and updated, giving particular attention to clearly stated outcomes. Adding clearly delineated outcomes to the course outlines, and to the syllabi will help orient part-time instructors, especially those who haven't taught before. The outcomes listed on the course outlines should match the outcomes listed on the corresponding course syllabi. The course titles should be consistent on outlines, syllabus, and the district catalogue.

2. We recommend that Chemistry faculty continue to work with Nursing faculty to ensure that the course objectives for CHE 101 are reasonable for a quarter class.

3. We recommend that the program establish an assessment plan and meet regularly to review the plan and document their assessment reports.

4. With so many part-time faculty, and the high turn-over rate, the program needs an additional full-time faculty position. In addition, we recommend that one of the full-time faculty positions has release time to coordinate the labs, staff, and train part-time instructors.

5. The program has a need for regularly updating equipment and replacing supplies. We recommend investigating revenue sources to help support the program.

Questions

There was concern brought up in the meeting that students in CHE 100 (general education) and CHE 101 (career oriented) were not always enrolling into the most appropriate course for

their educational goals and abilities. Is this indeed an issue, and what might be done to address this concern?

Response: The selection of CHE 100 or CHE 101 appears to be a confusing one for some of our students. Currently, I am not aware of any misplaced students in the spring quarter sections of CHE 100 or CHE 101. However, it is important to remind advisors of the purpose of each course: CHE 100 is a non-majors course, and CHE 101 is a more rigorous course designed for nursing, dental hygiene, and biotechnology students. Either course fulfills the lab science requirement of the AA (The Natural World). This reminder is not limited to the advisors and it is equally important to have the faculty inform their students of the course purpose on the first day of class. The faculty can also add to their syllabi course content and course outcome sections to inform the students. I have just made changes to the district catalogue that should also clarify the distinction. Additionally, I have discussed with the faculty the re-development of CHE 100 into a lab science course that reveals chemical concepts via case studies rather than the traditional textbook approach. This change would remove any similarities between the two courses that could be confusing to students.